



**SAN FRANCISCO PUBLIC UTILITIES  
COMMISSION**

City and County of San Francisco

**London N. Breed**  
Mayor

**SPECIAL MEETING MINUTES**

**Friday, October 29, 2021**

**2:00 P.M.**

**(Approved November 9, 2021)**

This meeting was held by Teleconference Pursuant to the Governor's Executive Order N- 29-20 and the Twelfth Supplement to Mayoral Proclamation Declaring the Existence of a Local Emergency Dated February 25, 2020

During the Coronavirus Disease (COVID-19) emergency, the San Francisco Public Utilities Commission's (SFPUC) regular meeting room, City Hall, Room 400, is closed. Commissioners and SFPUC staff will convene Commission meetings remotely by teleconference.

**Commissioners**

Anson Moran, President  
Newsha Ajami, Vice President  
Sophie Maxwell  
Tim Paulson  
Ed Harrington

**Michael Carlin**  
Acting General Manager

**Donna Hood**  
Secretary



1. Call to Order

*President Moran called the meeting to order at 2:00 PM.*

2. Roll Call

*Present: Moran, Ajami, Maxwell, and Harrington*

*Excused: Paulson*

*President Moran stated that there have been multiple workshops with a great deal of information provided. He stated that climate change is an important topic and indicated that Commissioner Harrington would chair the meeting.*

*Chair Harrington stated that the SFPUC can look 10-15 years ahead with projects and that it takes time to make changes that are needed. He stated that climate change is a large unknown and that as we learn more, better planning and decisions can be made. He stated the purpose of the workshop is to have a common understanding as to what is and isn't known about climate change and its effect on the Regional Water System.*

3. Climate Change and the Regional Water System

a) San Francisco Public Utilities Commission Staff Presentation

*Ellen Levin, Deputy Manager, Water Enterprise, began with a review of the agenda and introduced the panel members: Alexis Dufour, Water Resources Engineer, Hydrology and Water Systems Group, David Behar, SFPUC Climate Program Director, and Dr. Casey Brown, University of Massachusetts, Amherst.*

*She provided a timeline of the history of the Climate Change Analysis, 2005 thorough 2020; and the WSIP Climate Change Analysis (the change in snowline that would result from the projected rise in temperature of 3 degrees Celsius between 2020 and 2050).*

*Deputy Manager Levin reviewed sensitivity of the Upper Tuolumne River Flow to Climate Change scenarios, indicating (1) it was a joint study with the Turlock Irrigation District; (2) up to +5 degrees Celsius and -15% perception changes were studied in 18 climate scenarios; (3) climate change effects will be most serious in dry years; (4) snow accumulation is reduced and snow melts earlier in the spring; (5) the distribution of runoff will shift, with winter and early spring runoff increasing and late spring and summer runoff decreasing; and (6) while temperature increases alone have an effect, the most significant effects are seen when temperature increases and precipitation decreases.*

*Ms. Levin introduced Alexis Dufour who presented the following:*

**Observations of Climate Change in Regional Water System Watersheds**

- Warming in SFPUC Watersheds: Annual averages of daily minimum temperatures across the Upcountry, Peninsula and East Bay regions.
- Precipitation in SFPUC Watersheds: Annual precipitation across the Upcountry, Peninsula and East Bay regions.
- Changes in Snowpack in SFPUC Watersheds: (1) trend in earlier snow

disappearance in the past 30 years by 15-20 days; (2) greater portion of the annual water available to the City on the Tuolumne River occurring prior to June 15<sup>th</sup>, presumably due to earlier snowmelt; and (3) dates of peak snowpack disappearance in the Upcountry watershed (10-year moving window 1988-98 to 2010-20).

### **Using and Developing New Forecasting Tools**

- **Advanced Quantitative Precipitation Information:** (1) improve prediction of precipitation, streamflow, and storm surge in the San Francisco Bay Area; and (2) National Oceanic and Atmospheric Administration.
- **Forecasted Informed Reservoir Operations:** (1) combines weather and inflow forecasting with operational restrictions to guide reservoir operations; (2) implemented at Hetch Hetchy, Cherry and Calaveras Reservoirs; (3) allows for flexible operations to maximize carryover storage; and (4) ongoing effort at multiple dams in California.
- **Airborne Snow Observatory:** (1) a coupled imaging spectrometer and scanning lidar system mounted on an airplane; (2) scanning determines snow depth; (3) calculation of Snow Water Equivalent; and (4) forecast seasonal water supply from snowmelt.

David Behar, SFPUC Climate Program Director, continued with a presentation of the following.

### **Engagement with Climate Science and Climate Change Collaborations**

- **National: Water Utility Climate Alliance (WUCA):** Fourteenth year with 12 utilities participating nationwide to collaboratively advance water utility climate change adaption. Leading practices in climate adaption with a goal to develop a set of versatile leading practices grounded in WUCA experiences, that spur innovations within and across utilities and with the adaption community more broadly. With a path to gather and share WUCA's experiences to help develop and implement climate change adaption mor effectively.
- **Regional: Bay Area Climate Adaption Network:** Fourth year with 43 member organizations including 21 local governments and nine community-based organizations. Part of a larger network of seven collaboratives from California (Alliance of Reginal Collaboratives for Climate Adaption). Key focus area (goal) is equitable adaption.
- **City: Sea Level Rise:** San Francisco's first Sea Level Rise Policy was adopted on September 22, 2014 (revised in 2015 and 2020). Mr. Behar reviewed sea level rise circa 2013 (ranges), 2015 sea level rise projections, and a sea level rise checklist.
- **SFPUC: Climate Change Coordination and Collaboration Committee (C5):** established to develop, coordinate, and communicate a comprehensive and consistent approach to mitigate and adapt to climate change. C5 activities include lunch and learns, inventory of climate related projects at the SFPUC and assembling an annual Multi-enterprise Climate Change Report that is presented to the Commission, presentations form SFPUC and City staff on projects, and work on a climate change policy and implementation plan for the SFPUC.

Dr. Casey Brown, Director, Hydrosystems Group, University of Massachusetts, Amherst, continued with a presentation on the results of their study, "Identifying Long-Term Vulnerabilities for the SFPUC Regional Water System".

### **Long-Term Vulnerability Assessment**

- **Long-term Vulnerability Assessment Approach:** Provides a comprehensive understanding of water system performance under a wide range of uncertainties. Explores a range of plausible futures rather than relying on a "best guess" prediction. Focuses on addressing vulnerabilities and building robustness and provides a framework for evaluating water supply portfolios and operations.
- **How Climate Science Informs Decisions:** Top-down impact studies (climate projections - predict and consider); and adaptation decisions (climate science – frame decisions, climate stress test (key step), and to evaluate vulnerabilities.
- **Motivating Questions:** (1) under what conditions and when with the Regional Water System (RWS) no longer meet system performance criteria over the planning horizon 2020 to 2070; and (2) is climate change the most important driver of vulnerability for the RWS and if not, what is?
- **New Tools for Future Planning:** input, modeling system, and output.
- **Why is Future Climate Uncertain:** (1) unknown future Greenhouse Gas (GHG) emissions (less influential at local scale); (2) unknown response of the climate system to GHG emissions (test scenarios of warming and precipitation change); and (3) natural climate variability (test scenarios of variability).
- **How Does Climate Change Affect Water Supply:** Changing runoff (hydrology model); capability of the systems to manage runoff changes (water system model); and other factors – e.g. water rights, water demand, water supply augmentation, (water system model).
- **Climate Stress Test Scenarios:** Informed the study.
- **Upcoming Watersheds:** Hydrologic results (inflows) with 5 degree warming. (Hetch Hetchy, Cherry/Eleanor, Don Pedro, and LaGrange).
- **Warming Equals More Variable Water Available to the City (WAC):** Effect on warming results in increased variability for WAC.
- **East Bay and Peninsula Watersheds:** Hydrologic response to temperature and perception change. More warming reduces the mean inflow.
- **Climate Change Effect on Drought:** Drought recurrence interval (years) with 0%, -10%, and -20% precipitation change; and with Zero, 2, and 4-degree temperature change.
- **Measuring Performance – Reliability:** Storage and operation results – reliability of water delivery. The frequency of years the system delivers full demand (i.e. no rationing has been applied). Target is 90% (one year of rationing out of 10 average).
- **Effect of Temperature:** Water delivery reliability is insensitive to temperature change.
- **Effect of Precipitation:** Vulnerable if precipitation decreases by more than 20%.
- **Climate and Instream Flow Requirements:** The State amended Water Quality Control Plan causes a significant increase in frequency of rationing. It is an

- equivalent increase in frequency of rationing as a decrease of 15% in mean annual precipitation from severe climate change.*
- *Climate and Infrastructure Failures: (1) failures relate to importing water from the upcountry are most important; (2) decreases in precipitation exacerbate the vulnerability to infrastructure failure; and (3) unplanned outages of Harry Tracy Water Treatment Plant caused less vulnerability to water supply.*
  - *Raw Water Quality – Turbidity and Total Organic Carbon (TOC): (1) turbidity increases with increases in mean precipitation; (2) TOC was generally less responsive to mean climate change overall; (3) overall, raw water quality deterioration in turbidity or TOC does not appear to be a major concern.*
  - *Climate Change and Finance: If major capital investment is needed, substantial increases in the price of water are required. Increasing demand may offset this effect, but also reduces water supply reliability.*
  - *Long Term Vulnerability Conclusions: (1) the RWS is resilient to change in mean climate and other external drivers at a baseline demand of 227 mgd; (2) the RWS faces reliability challenges in mean precipitation decreases by 20% or more; (3) such precipitation changes are at the low end of Global Climate Model projections and expert opinions; and (4) climate change exacerbates impacts from other external drivers of change.*
  - *Continuing Preparedness: (1) use tools from this study to evaluate climate change with SFUC's new alternative water supply projects; (2) identify Decision Thresholds and Sign Posts; (3) monitor climate change in SFPUC watersheds and continuously update climate projections and impacts; and (4) improve SFPUC's hydrologic simulation models.*

*Ms. Levin provided concluding remarks noting that the information and tools from the assessment will be used to inform policy decisions by the Commission.*

*Vice President (VP) Ajami thanked the presenters and asked the following: (1) she noted the inconsistency that is happening with mean and temperature change and questioned if that inconsistency was considered as part of the study; (2) she would like to see projections on uncertainty in demand, and information on the interplay between finance and infrastructure and requested clarification on the meaning of infrastructure for this discussion; and (3) she stated the SFPUC needs the capacity to conduct much of the work in-house. Ms. Levin, and Dr. Brown provided response. Discussion ensued.*

*President Moran stated that the precipitation patterns analysis looked at single year drought events and stated that the availability of storage is important to the SFPUC. He questioned if the study considered the use of storage over time or the length of drought sequences versus the number of dry years. Dr. Brown indicated that multi-year droughts were looked at and the metric is reported on a year-by-year basis and indicated the drought scenarios are all multi-year and account for storage. Brief discussion ensued.*

*Chair Harrington asked if the assessment addressed water available to the City, given precipitation changes. Dr. Brown indicated it is difficult to project and the assessment doesn't show a clear trend (increase or decrease), but with warming*



conditions it may become more variable. Brief discussion ensued.

Steve Ritchie, Assistant General Manager, Water Enterprise, stated that the approximately 600-page report will be published soon by the Water Research Foundation. He noted a fact sheet and brochure will also be prepared.

- b) Bay Area Water Supply and Conservation Agency (BAWSCA) Questions/Comments  
Nicole Sandkulla, BAWSCA CEO, thanked the Commission for the workshop and the presenters for the information. She stated that BAWSCA supports the work to evaluate long-term impacts of climate change on the Regional Water System and supports the investment in the Long-Term Vulnerability Assessment. She stated that moving forward it is important that the information be used to inform planning to ensure water system reliability and for alternative studies. She expressed hope that the information will be used on the Design Drought and for evaluation of Alternative Water Supplies.

Mr. Dufour responded to CEO Sandkulla's question as to whether vulnerability factors in the assessment are connected.

- c) Non-Governmental Organization Questions/Comments  
Peter Drekmeier, Policy Director, Tuolumne River Trust, asked (1) if the model results are based on the Design Drought. Mr. Dufour stated they have not provided the results of the Design Drought, but rather results of plausible droughts; and (2) where the baseline demand figure of 227 came from. Mr. Dufour and Ms. Levine provided response. Brief discussion ensued. Dr. Brown stated that the study is not making conclusions as to what is happening to mean participation and that the range is broad, and that it can increase or decrease.

Mr. Drekmeier discussed slide 39 (Upcountry Watersheds) and asked if there was an understanding of the Raker Act. Ms. Levin indicated everyone is aware of the Raker Act and the Fourth Agreement. Dr. Brown confirmed his knowledge of the Raker Act and stated that the final report will provide more in-depth information and discussed the charts in question. Ms. Levin stated that the full study needs to be reviewed when available as there is variability not seen in the slides. VP Ajami provided additional information regarding the variabilities presented on the slide.

Mr. Drekmeier discussed slide 47 (Precipitation and Demand) and asked if the models could be re-run looking at using different factors. He encouraged the Commissioner to request different model runs in the report.

Mr. Dave Warner stated he is looking forward to reading the full report. He discussed slide 43 (Climate Change Effects on Drought) and questioned the source for the data. Dr. Brown stated that historical records provided by SFPUC was used and Mr. Dufour confirmed that historical information, tree ring data, and 25,000 years of simulated hydrology was used. Mr. Warner noted that none of this information was available when the Design Drought was created. He asked if a line could be added to the table shown in slide 43 regarding the Design Drought. Mr. Dufour provided

*response. Brief discussion ensued.*

*Mr. Warner discussed slide 46 (Effect of Precipitation) and stated that the -30% to +30% range is very broad.*

*Chair Harrington asked staff to respond to Mr. Drekmeier's question about changing the report. Ms. Levin state that Water Research Foundation studies do not provide for public input. She stated a technical panel was convened to review the work prior to publishing and that the report will be final.*

#### 4. Public Comment

- Francisco DaCosta stated the Commission should be ashamed as the First People are not included in the discussion. He asked why the Raker Act is not being followed. He stated the salmon need assistance and that there is greed.*
- Iris Stewart, Professor, Environmental Science, Santa Clara University, discussed her background and research. She thanked the Commission for presenting the Assessment and indicated there are other scenarios that can be explored. She questioned Dr. Brown statement on instream flow requirements.*

*At the request of Chair Harrington, Dr. Brown responded to Professor Stewart's question and noted the instream flow requirements are described implicitly in the report, which will be published soon. He affirmed her thought that instream flow requirements reduce the flow of rationing.*

*Chair Harrington thanked everyone for their work, for the presentations, and the conversation.*

*VP Ajami noted the assessment will be a great tool and that it would be valuable to be able to change the assessment as assumptions and paraments change over time.*

*President Moran thanked presenters for the information and stated he looks forward to utilizing the information and insights in decision-making.*

*Commissioner Maxwell thanked the team for their work and insights.*

#### 5. Adjournment

*Chair Harrington adjourned the meeting at 4:28 PM.*